This document provides information specific to VirtualBox.

The kickstart can be used with virtualization products VMWare ESXi and VMWare Workstation. Please see additional “VMWare” notes in Appendix A and B

The Operating System for server1 and the stations can be Red Hat Enterprise Linux or CentOS. RHEL 6.1 and CentOS 6.4 have been tested for functionality.

This document will walk through setting up the virtual environment, then the virtual machines for a single “server1” and up to 41 “Stations”. For a single person environment, 2 Stations should be adequate to complete and test exercises.

Installing the server1 Operating System is completed with a CentOS 6.4 i386 DVD (DVD 1 only), and a kickstart file that provides the configuration and setup.

Station VMs will be installed using DHCP and PXE, so you simply turn on the VM and it will start an install, and then require a restart.

Software Downloads:

CentOS Mirrors  
<http://www.centos.org/modules/tinycontent/index.php?id=30>

Appendix A contains information for configuration of VMWare ESXi Virtual Machines

Appendix B contains information for installing VMWare Tools automatically on “stations”

# Installing the “server1” Virtual Machine

* Create a new Virtual Machine
* Name: CentOSLab-server1  
  The Type changed automatically to Linux and Version to Red Hat.  
  Click Next >
* 2048GB of RAM  
  Click Next >
* Create a virtual hard drive now  
  Click Create
* Hard drive file type: VDI (VirtualBox Disk Image) (default)  
  Click Next >
* Dynamically allocated (default)  
  Click Next >
* Change the size to 40.00 GB

Click Create

Customize the Network Settings

* The VM CentOSLab-server1 should be selected on the left, click “Settings”
* In the Settings window, select Network on the left
* Adapter 1 defaults should be enabled and NAT – no change is required
* Click the Adapter 2 tab
* Check the box for Enable Network Adapter
* Select Attached to: Internal Network
* Set the Name to: CentOSLab

Customize the CD-ROM

* Select “Storage” in the settings window
* Select the CD image under “Controller: IDE”
* In the Attributes section on the right, beside CD/DVD Drive: and to the right of the dropdown is a CD image with an arrow pointing down, Click it
* Choose a virtual CD/DVD disk file...
* Select the DVD iso image CentOS-6.4-i386-DVD1.iso

Click Open

Add a floppy controller and floppy drive

* Still in “Storage” in the settings window,
* Add a new controller by clicking the button
* Click “Add Floppy Controller”
* Next to the new Controller: Floppy, click the button
* In the Dialog Window, select “Choose disk”
* Browse to linux\_lab\_floppy.img, select it and Click Open

Click OK at the bottom of the Settings window.

# “Station” Virtual Machines

Station naming ranges from station 10 to station 50  
Create a new Virtual Machine

* Name: CentOSLab-station10  
  The Type changed automatically to Linux and Version to Red Hat.  
  Click Next >
* 1024GB of RAM  
  Click Next >
* Create a virtual hard drive now  
  Click Create
* Hard drive file type: VDI (VirtualBox Disk Image) (default)  
  Click Next >
* Dynamically allocated (default)  
  Click Next >
* Change the size to 20.00 GB

Click Create

Customize the Network Settings

* The VM CentOSLab-station10 should already be selected on the left, click “Settings”
* In the Settings window, select Network on the left
* The Adapter 1 tab is already select
* Select Attached to: Internal Network
* Set the Name to: CentOSLab (this may be populated)

Click OK at the bottom of the Settings window.

# Passwords

root is the superuser on a Linux system, similar to administrator in Windows. You will need the “root” password to login to your new Server1 and Stations. That password, and a few others that are used on Server1 are included here:

username: root  
password: password

username: studentuser

password: password  
  
ldap   
Use the command "slappasswd" to generate the hash  
BINDDN cn=Manager,dc=example,dc=com  
password: password  
  
CA passphrase: cacertpass

# Installing Server1

* Highlight the VM CentOSLab-server1 on the left, and click Start
* Hit F12 to select the boot device, and press c to boot the DVD

(The default keys to release the mouse from a VirtualBox window is the RIGHT CTRL key)

* The top “Install or upgrade an existing system” option should be selected
* Press TAB to edit the line, add “ ks=floppy” and hit enter
* There may be a prompt window, “Storage Device Warning”, Click “Yes, discard any data”
* Click Reboot when the installation completes

# Installing the station

The server provides dhcp on the private network and

pxe/tftp to install the stations.

Create the station VM with the specifications above.

Select the VM on the left, and click the “Start” button.

VirtualBox will ask that you set a boot device, select the hard drive.

During the VirtualBox BIOS splash screen, press F12.

Press “l” to boot from LAN

The VM will boot and install over the network.

More details about what it does:

Power on the workstation, it will boot from network,

obtain a dhcp address, pull the kernel from tftp,

then will pull the kickstart and remaining files

from server1 automatically.

# What server1 provides

hostname: server1.example.com

eth0: DHCP

eth1: 172.26.0.1

student accessible account passwords are "password"

routes through 172.26.0.X to 172.26.X.0/24

permits the server to reach a second nic on the station

with the second nic being on the network 172.26.X.0/24

NIS and LDAP directory services are available

Users named guest01-50 exist local and in directory services

ldapuser exists local and in directory services

localuser exists on the local server only

An example repo file exists in /var/ftp/pub/materials/server1.repo

also available at

ftp://server1.example.com/var/ftp/pub/Server

http://server1.example.com/pub/rhel6.1/Server

nfs server1:/var/ftp/pub/rhel6.1/Server

DHCP

assigns addresses 172.26.0.101-150

DNS

PTR records for 172.26.0.201-250 resolve stationX.example.com

PTR records for 172.26.0.101-150 resolve dhcpX.example.com

dhcpX.example.com resolves to 172.26.0.101-150

stationX.example.com resolves to 172.26.0.201-250

stationX.com resolves to 172.26.0.201-250

TFTP

To provide for PXE boot of student stations

NTP server

there is not a stratum clock in the lab

NTP is setup to think its own clock is a stratum 3

Would work better if there was a stratum clock available to the lab

check the local time table with "ntpq -pn"

LDAP

Users named guest1-50 with the password “password”

ldap directory is setup with all non-daemon users

NIS

NIS structure exists with non-daemon users

NFS exports

/var/ftp/pub \*(ro,sync)

/home/server1 \*(rw,sync)

iSCSI Targets for each station

25M each

# Appendix A - Installation with ESXi Configuring the ESXi environment

Create a vSwitch named “Private” with no physical network uplink  
Create a vSwitch named “Public” with a network uplink available to workstation PCs.

# Installing the “server1” Virtual Machine

* Create a new Virtual Machine
* Typical configuration
* Name: server1
* Choose a host appropriate for your environment
* Choose a datastore
* Guest Operating System: Linux  
  Red Hat Enterprise Linux 6 (32-bit)
* Virtual Disk space (GB): 40 GB  
  Allocate and commit space on demand (Thin Provisioning)  
  Support clustering features such as Fault Tolerance
* Check Edit the virtual machine settings before completion
* In the Edit Virtual Machine window:

Click “Add…”

Ethernet Adapter  
NIC 2

Network: Private

(Still in the Edit Virtual Machine window)  
For items listed below without a value, retain the default:

* Memory: 2048 MB
* CPUs
* Video card
* VMCI device
* New CD/DVD
* New Floppy
* New SCSI Controller
* New NIC 1  
  Network: Public
* New NIC 2

Network: Private

* New Hard Disk

# “Station” Virtual Machines

Station naming ranges from station 10 to station 50

Each station VM should have the following specifications:

* Memory: 1024 MB
* CPUs
* Video card
* VMCI device
* New CD/DVD
* New Floppy
* New SCSI Controller
* New NIC 1  
  Network: **Private**
* New Hard Disk: 20 GB (thin provisioned)

Add…

Hard Disk

Create a new virtual disk

Disk Size: 1 GB

Check Allocate and commit space on demand (This Provisioning)

Store with the virtual machine

(other options are left default)

# Appendix B - placing VMWare tools for automatic station installation

If the lab is deployed on VMWare ESXi or VMWare Workstation the VMWareTools\*.tar.gz is available by Installing VMWare Tools on the server1 and copy the tar gz from the virtual CD.

The kickstart will automatically install VMWare Tools on the clients if they are a VMWare VM during install, as identified by the virtual BIOS.

To automatically provide VMWare Tools during station install, copy VMwareTools-\*.tar.gz to /var/ftp/pub/materials/VMwareTools.tar.gz